

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

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MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2015/2016

**PSP 0101 – PROBLEM SOLVING AND PROGRAM DESIGN /
PSP 0015 – PROBLEM SOLVING IN PROGRAMMING AND
SYSTEM DESIGN**
(Foundation in Information Technology)

12 MARCH 2016
2.30 p.m – 4.30 p.m
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of THREE pages excluding the cover page.
2. Answer ALL questions.
3. Write your answers in the Answer Booklet.

Instructions: Answer **ALL** questions. Write your answers in the Answer Booklet.

QUESTION 1 [25 Marks]

a. Mark wants to write a computer program to calculate and display the total of retail sale of an item. The given inputs for this program are the retail price of the item and its sales tax rate. In order to solve the problem accurately, he has to write an algorithm. His approach is to use the algorithmic solution. Answer the following questions to help Mark solves this problem.

- What is an algorithm? (1 mark)
- Write an algorithm to solve Mark's problem. (3.5 marks)
- What is heuristic solution? Can you apply heuristic solution approach to solve this problem? Why? (2.5 marks)

b. What are the steps involved during the design validation stage in Program Development Life Cycle? (5 marks)

c. Write the following mathematical equations in computer terms.

- $$G = 4\pi^2 \left(\frac{a^3}{p^2(m_1+m_2)} \right)$$
 (4 marks)
- $$K = \sqrt{a^2 + b^2 - 2ab}$$
 (3 marks)

d. The following pseudocode has errors. List and explain the errors and rewrite the pseudocode correctly.

```

start
width x height = Area
get Width
get height
display area
end

```

(6 marks)

QUESTION 2 [25 Marks]

a. What are the **THREE (3)** primary activities of a program?
(3 marks)

b. A painter has been given a job to paint all the 4 walls of a rectangular shaped room, excluding a rectangular shaped door. How many inputs need to be entered in a particular computer program to calculate how much paint is needed to paint that room? Prepare an IPO chart for this program.
(10 marks)

c. Draw a flowchart to support your answer in Question 2 (b).
(12 marks)

QUESTION 3 [25 Marks]

a. You are asked by a hotel manager to create a program to calculate the hotel room price. A discount of RM15 per day is given when a customer stays more than 5 days. No discount is given if the customer stays 5 days or less. How many variables are needed for this program? Write the equations to find the hotel room price for these two different scenarios.
(2.5 marks)

b. Write the pseudocode using positive logic structure for a program to calculate and print the value of the user's budget and the lightsaber type that he/she can afford to buy, when the given inputs are his/her income and the percentage of the income he/she is willing to spend on the lightsaber. The program should be able to determine and print the type of lightsaber the user can purchase based on his/her budget. Refer to Table 1 below.

Budget (RM)	Lightsaber Type
Less than 1000	GUARDIAN Warrior Edition
1000 to less than 1500	EPOCH DT Champion Edition
1500 to 2000	EXHALTED Hero Edition
More than 2000	KATANA Warrior Special Edition

Table 1

(10.5 marks)

c. Kylo wants to write a program that asks the user to enter an integer and then prints out all the even numbers up to that integer. For example, when the user enters 20, the program will print: 2 4 6 8 10 12 14 16 18 20
Draw a flowchart for this program by using while loop structure.

(12 marks)

QUESTION 4 [25 Marks]

- a. Draw a flowchart for a program that uses array to allow the user to store the value of the money spent in a month for a year. After the values are entered, the program will then display the average and the value of the maximum amount of money spent. (Hint: Use an automatic counter loop)
(19 marks)
- b. Write a pseudocode for a function definition that will ask the user to enter a password and another function definition to check the password. The password should be: LukeSkywalker. If the user enters the correct password, print "May the force be with you" on the screen, otherwise, print "Execute Order 66".
(6 marks)